

MSC Guidelines for Review of Steering Gear Controls and Alarms

Procedure Number: E2-20

Revision Date: 03/09/00

References:

- a. Title 46 CFR 111.70
 - b. Title 46 CFR 113.40
 - c. Title 46 CFR 113.43
 - d. Title 46 CFR 58.25
-

Disclaimer

These guidelines were developed by the Marine Safety Center staff as an aid in the preparation and review of vessel plans and submissions. They were developed to supplement existing guidance. They are not intended to substitute or replace laws, regulations, or other official Coast Guard policy documents. The responsibility to demonstrate compliance with all applicable laws and regulations still rests with the plan submitter. The Coast Guard and the U. S. Department of Transportation expressly disclaim liability resulting from the use of this document.

If you have any questions or comments concerning this document, please contact the Marine Safety Center by e-mail or phone. Please refer to the Procedure Number: **E2-20**

E-mail: customerservicemsc@uscg.mil

Phone: 202-366-6480.

General Review Guidance

Vessels Subject to Subchapters (F) & (J)

- ❑ Each power driven steering gear system shall have at least one steering gear control system; the steering gear control system shall provide **full follow-up control** of the rudder. (58.25-70(b))
 - ❑ For steering systems with only the main steering system power driven, two separate and independent full follow-up control systems shall be provided in the pilothouse. Steering wheel/lever duplication is not required. (58.25-70(i))
-

MSC Guidelines for Review of Steering Gear Controls and Alarms

Procedure Number: E2-20

Revision Date: 03/09/00

- ❑ Steering systems with two of more identical power units in lieu of auxiliary steering gear shall provide two separate and independent follow up control systems, except for the following: (58.25-70(h))
 - ❑ Steering wheel/lever duplication is not required.
 - ❑ If hydraulic telemotor type steering gear, control system duplication is not required.
- ❑ Power driven auxiliary steering must have a control system provided in the pilothouse that is separate and independent from the main steering gear control system except steering wheel/lever duplication is not required. (58.25-70(j))
- ❑ Audible and visual alarms/indicators shall be provided in the pilothouse for the following conditions: (58.25-25(d))
 - ❑ Steering gear control system power supply failure
 - ❑ Steering gear power unit power supply failure
 - ❑ Steering gear reservoir low oil level
 - ❑ Steering gear “motor running”
- ❑ Audible and visual alarms shall be provided in the machinery space for the following conditions: (58.25-25(e))
 - ❑ Steering gear three phase power failure
 - ❑ Steering gear motor overload
 - ❑ Steering gear reservoir low oil level
 - ❑ Steering gear “motor running”
- ❑ Audible and visual steering failure alarms are required in the pilothouse for all vessels over 1,600 gross tons. The alarm shall sound when the actual rudder position differs by more than 5 degrees from the ordered rudder position, for more than the time allowed by 113.43-3. (58.25-25(c))
 - ❑ Steering failure alarm shall be independent of other steering gear circuits. (113.43-5(a))
 - ❑ Steering failure alarm shall be fed from the emergency power source via the pilothouse emergency panel. (113.43-5(b))
 - ❑ Instantaneous trip protection set at 400% - 500% of the conductor ampacity or normal system load shall be provided; overcurrent protection is prohibited. (113.43-5(c))
- ❑ Rudder angle indication shall be provided at the pilothouse and steering gear compartment. (58.25-25(a))

MSC Guidelines for Review of Steering Gear Controls and Alarms

Procedure Number: E2-20

Revision Date: 03/09/00

- ❑ The rudder angle indicators shall be independent of the steering gear control, autopilot, and dynamic positioning systems. Power must be provided from an emergency power source. (58.25-25(b), 113.40-10).
- ❑ Limit switches shall be provided for securing the steering gear before the rudder reaches its mechanical stops. (58.25-50(a))
- ❑ Instantaneous trip protection shall be provided for the steering gear motors. The trip shall be set at 175% - 200% of the AC motor's locked rotor current. Overcurrent protection is prohibited. (58.25-55(a))
- ❑ Overcurrent protection is prohibited in the motor controller, steering gear control and steering gear alarm circuits. Instantaneous trip protection set at 400% - 500% of the conductor ampacity or normal system load shall be provided. (58.25-55(d))
- ❑ The control system short circuit protective device shall be physically located in the steering gear room in the control circuit, immediately following the control system disconnect switch. (58.25-55(e))
- ❑ Separate feeder circuits shall be provided for each electric driven steering gear power unit. Where an emergency power source is required, one of the feeders shall be from the emergency switchboard. (58.25-65(b))
- ❑ Each power unit shall have a disconnect switch and controller in the steering gear compartment (58.25-65(c), 58.25(70))
- ❑ Each power unit feeder circuit shall have a current carrying capacity of 125% motor full load current and 100% of the normal steering gear control system including the motors. (58.25-65(d))
- ❑ The steering gear control systems shall receive power from either the feeder circuit for the steering gear power units located in the steering gear compartment, or a direct connection to the switchboard busbar adjacent to the power unit feeders. (58.25-70(d))

MSC Guidelines for Review of Steering Gear Controls and Alarms

Procedure Number: E2-20

Revision Date: 03/09/00

- ❑ Each control system shall be provided with a switch located in the pilothouse that provides power to a complete system (control system and power unit) (58.25-70(c))
 - ❑ Operated by a single lever.
 - ❑ Arranged such that only one control system may be energized at a time.
 - ❑ The switch passes through the “off” position when transferring between control systems.
 - ❑ The two control systems are either in individual enclosures or are separated by fire resistant barriers.
 - ❑ Each control system shall have a switch located in the steering compartment that disconnects the system from its power source and from the steering system that it serves. (58.25-70(e))
 - ❑ On vessels over 500 gross tons, the main and auxiliary steering gear must be operable from the steering gear compartment. These controls shall not be rendered inoperable in the event of pilothouse control system failure. (58.25-70(k))
 - ❑ If non-follow-up steering control is provided at the alternative steering station, the indicators at the steering stations shall be electrically independent of the other rudder angle indicators. (113.40-5)
 - ❑ The steering gear motors shall be equipped with low voltage release (LVR) motor controllers. (58.25-30)
 - ❑ A switch shall be provided at the primary steering position in the pilothouse that will completely disconnect automatic equipment, such as automatic pilots, from the steering gear system. (58.25-80(a))
 - ❑ Automatic pilots and ancillary steering gear shall be arranged such that a single failure will not affect the main or auxiliary steering gear, rudder angle indicators, or steering failure alarm. (58.25-80(b))
-

Attachments:

None